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14 APR 1982

MEMORANDUM FOR: Director of Central Intelligence
Deputy Director of Central Intelligence

DDI- 2506-82

VIA : Deputy Director for Intelligence

FROM : [REDACTED]
Director of Soviet Analysis

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: E. W. Boring
Director of Scientific and Weapons Research

SUBJECT : Microanalysis of the Soviet Military Industrial Complex

1. Action. No action required. For your information only.

2. Background. This is in response to your memorandum of 25 March 1982 raising questions about the potential of and requirements for microanalysis of the Soviet military industrial complex. You also raised questions about the Soviet predilection for long production runs and the military civil trade-offs in the Soviet economy. We touched on these issues in the SOVA memorandum on the "Soviet System", dated 29 March, and the short study attached to it. In the first few paragraphs of this memorandum, these issues are amplified and placed in the context of the inherent inertia which characterizes the Soviet command economy. In the latter part of the memorandum and in the attachments we address your request for an understanding of the potential pay-offs of and the requirements for a broad microanalysis of the Soviet military industrial complex.

Inertia in the Soviet Economy In analyzing the Soviet military industrial complex, the nature of the Soviet command economy has unique features that contrast fundamentally with resource allocation processes in the United States. The Soviet political leadership endorses a strong defense establishment and has set forth national resource patterns consistent with this goal. The momentum imparted by this priority is reenforced by the nature of the planning system. Weapons programs must be accompanied by conscious, detailed allocations of physical resources. In the United States policymakers focus on weapons budgets and leave the mechanics of resource allocation to the market place. In the USSR the market place has no vote. The sheer burden of detail required by the

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Soviet approach precludes frequent reconsideration of resource decisions. Fundamental national policy reviews are required only at five-year intervals when national economic plans are prepared. Even then the plan targets tend to reflect only incremental changes to existing programs.

Within the command economy the allocation of resources to the military industrial complex is compartmented, highly centralized and secretive. This planning process translates priorities into the legal sanctions that ensure fulfillment of plan targets. A separate section of Gosplan oversees the drafting of the five-year economic plan for the defense industries which is designed to fulfill demands of the corresponding five-year defense plan prepared by the Soviet General Staff.

As a result of these factors, defense plans are composed of development and production programs that are not easily altered. Momentum also permeates other levels of the defense industries. Defense, political, and industrial leaders have long associations with the military industrial sector and have accrued status, rank, and other benefits. Moreover, significant bonuses and incentives for meeting development milestones or production goals have resulted in a planning system that sets goals conservatively, is slow and evolutionary in nature, and changes direction little year by year.

Inertia also extends to the Soviet weapons acquisition process and design philosophy which stresses evolutionary or incremental development and controlled introduction of advanced technology to fulfill evolving military requirements. Performance improvements are often sacrificed but the trade-offs are major cost savings, avoidance of excessive demands on the production and technology base, and a supply of weapons that can be readily used and maintained in the field by troops with limited technical skills. This approach, however, also results in a large number of weapon systems which are designed to perform a single, limited role.

In general, Soviet weapons reflect a commitment to rugged but functional designs which can be easily manufactured in large quantities. From 1970 to 1980, the Soviets produced approximately 36,000 tanks, of which nearly 50 percent were T-64s and T-72s. This figure includes tanks produced for Soviet ground forces and for export. In a production run of this scale, costs are substantially reduced through economies of scale and the use of standard components. Soviet tanks are also smaller, lighter, and less sophisticated in many of the more costly subsystems. The cheaper, less complex systems that result are also more attractive on Third-World export markets where both funds and skills are at a premium. However, the deployment of large numbers of weapons, especially tactical weapons, to counter a smaller number of technically superior weapons diverts key resources from the production of critically needed civilian equipment for agriculture, industry and transportation.

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The Military/Civilian Trade-Off

The Soviets have a host of economic problems that could be at least partially alleviated by cuts in military programs. Soviet behavior in the past, however, has been to continue to allocate a large share of national resources to the military. Even when military programs have been stopped or reduced possibly as a result of arms negotiations (ABM and the SS-16) the resources from these programs have been shifted to other military programs (battle-management radars and SAMs for tactical forces, and the SS-20). The severity of their economic difficulties, however, raises the question as to how long the Soviets can and will continue such a policy.

The feasibility and potential economic benefit of using Soviet defense productive capacity for civilian output varies by product and by industry. The Soviets could use some complete military products -- such as trucks and transport aircraft-- with minor modification in the transportation and agricultural sectors of the civilian economy. While most military final products are too specialized for alternative civilian applications, many of their materials and components could be used in civilian products. For example, the strategic missile and radar industries could produce civilian goods only with substantial retooling and a large sacrifice of specialized capital equipment as well as the uneconomic use of excessive skills and exotic fabrication technologies. Tank and armored vehicle production cuts deeply into dual-use automotive components and naval shipbuilding uses enormous quantities of steel. High-quality steel not used for armor or submarines could go directly into high-pressure gas pipe, railcar wheel pairs, and engine crankshafts. Production facilities for military engines could make high-temperature components for gas pipeline pumping turbines. Moreover, a large share of the plant space, tooling and skilled manpower used for defense products is technologically well-suited for alternative civilian production operations. Finally, a larger share of top scientific and engineering professionals now conducting military R&D could be reassigned to the civil sector.

Potential of and Requirements for Microanalysis

To undertake a microanalysis of the Soviet military industrial complex will require a high-level decision to redirect our research efforts, augment OSWR and SOVA resources, and refocus other Intelligence Community resources. We present in the following paragraphs and attachments our past and current research efforts, an evaluation of resource requirements, an overview of data availability, and the potential pay-off of an accelerated and expanded microanalysis.

The capability to perform microanalysis of the Soviet military industrial complex would obviously provide more in-depth answers to a variety of questions from US policymakers. Although we are building towards such capabilities, much remains to be done. Our knowledge of product lines is good and improving. Large amounts of data not used previously can now be used in analysis. Our facilities data base, however,

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is far from complete as is our understanding of the infrastructure of the industries. To accelerate this research, broaden its scope and at the same time produce reports to satisfy current demands, will require more resources than are currently available.

To date, our microanalysis of the Soviet military industrial complex has been driven by a need to forecast the appearance of future weapon systems to satisfy DOD planning and programming and NIE forecasting requirements. The result has been an analytical emphasis on R&D as opposed to production. As a result of this analytical effort, we have a fairly detailed comprehension of the facilities and the acquisition process, and we are gaining an appreciation of the resource commitment to the R&D sector. Much of our analysis of R&D facilities has been strategic weapons oriented such as "Strategic Missile Development Programs in the National Economic Planning Process," published in December 1981. Another project, "Soviet Naval Radar R&D" (March 1982), examined both R&D and production facilities. The latter research was contracted out because of the lack of in-house resources. We are just beginning to be able to connect technology advances with programs so we can better assess future threats.

Our analytical attention to production has followed two directions. We have devoted considerable attention to developing an understanding of the production process and a data base concerning production facilities. Thus far we have limited data on about 650 production facilities. We have yet to analyze thoroughly the defense industries' product lines, their capacity, their network of subsystem contractors, and their capability to transfer resources to the civilian sector. Our estimates of production, however, have been driven more by an understanding of what is entering the inventory in troop units than by direct evidence of production rates.

We are working with DIA, NSA, Army, NISC, FTD, and others to improve our ability to estimate production and to integrate more closely our consideration of the defense industries and the forces they support. We have improved our collection of data concerning the production facilities and have used the data base as a tool for forecasting, as in "Expansion in Soviet Defense Industries: An Indicator of Future Weapons Program Activity," published in March 1981. The data base also has been used as a tool to understand the life cycle of a program, including production rates such as in "Soviet Preparations for Production of the New Soviet Medium Solid ICBM" (March 1982). We also are working to improve our understanding of the rates of procurement, entry into the inventory, and useful life-cycle of land armaments--an area which in the past has been given substantially less attention than strategic programs. To this end, in the past year we have devoted five SOVA analysts, the support of about three photointerpreters and more than \$0.5 million in external research to develop a comprehensive understanding of the land armaments in the Warsaw Pact Forces. OSWR has established additional analytical positions to study the R&D establishment and land arms program development. All of this is

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coming together in a large interagency project to assess the Warsaw Pact's future land forces and armament production requirements.

A partial listing of some of the more relevant projects concerning economic issues, resource constraints, the acquisition process, research and development of weapon systems, production and force projections is presented in Tab A. The list contains projects completed, presently scheduled, and a few that are currently unscheduled that will be undertaken as resources become available.

In Tab B we present the types of research data available and the analytical framework needed for a microanalysis of the Soviet military industrial complex. An estimate of the resources needed to compile the data base and to produce reports to satisfy current demands is in Tab C. Estimates of resources and data requirements are based on our experience in constructing a similar microanalysis of the R&D sector. This analysis focused on R&D management and decision making processes, the R&D facilities and their weapons and space development programs, and the dollar costs of these programs. The cost of this effort over the past four years has been about [redacted] in external contracts. It has yielded a good data base [redacted] and has identified about [redacted] percent of the weapons and space programs now underway in the Soviet Union. Another effort, devoted to only the Soviet nuclear energy industry, has required [redacted] contracts. The R&D and nuclear energy efforts have required the support of between [redacted] imagery analysts in NPIC and OIA.

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E. W. Boring

Attachments:

- Tab A - Projects Completed and Underway
- Tab B - Microanalysis of the Soviet Military Industrial Complex: Areas of Research, Availability of Data and Intelligence Pay-offs
- Tab C - Resource Requirements

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S U B J E C T

SUBJECT: Microanalysis of the Soviet Military Industrial Complex

Distribution:

- Orig & 1 -- Addressee and return to Originator with attachments.
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1 -- Executive Director DCI w/attachments Tabs A, B, and C.
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Projects Completed and Underway

The research efforts of SOVA and OSWR address many issues designed to improve our knowledge of the Soviet military industrial complex. The research projects listed below are some of the projects undertaken to address DDI Priority Research Issue No. 1 as well as projects undertaken by SOVA and OSWR to address other key intelligence issues relating to the military industrial complex.

Projects Under DDI Priority Research Issue No. 1, "Military and Foreign Policy Consequences in the 1980s of the Deteriorating Soviet Economic Performance"

- Eight research projects and one overview paper, "The Development of Soviet Military Power," have been completed. A number of other research projects and one overview paper are scheduled for 1982. This research program is designed to assess Soviet economic prospects during the 1980s, detail the options available to Soviet leaders, and describe the political and military implications of their difficulties. The projects under this priority issue which deal directly or indirectly with military expenditures and/or the defense/civilian trade-off are listed below:

<u>Project</u>	<u>Office</u>	<u>Status</u>
The 11th Five Year Plan: Political and Military Implications	SOVA	2Q82
Resources for Soviet Military RDT&E	SOVA/OIA	2Q82
Dynamic Burden of Soviet Defense Spending	SOVA	3Q82
Soviet Military and Space Systems in Development	SOVA/OSWR	3Q82
Implications of Change in Soviet Military Policy	SOVA	4Q82
Implications of the Soviet Economic Slowdown	SOVA	4Q82
Military and Economic Impact of Alternative Defense Budgets	SOVA	Unscheduled.
Soviet Preparations for Production of the New Medium Solid-Propellant ICBM	SOVA	Completed
Soviet Spending for Defense: Trends Since 1951 and Prospects for the 1980s	SOVA	Completed

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Implications of Continued Production of the Soviet D-III-Class Ballistic Missile Submarines	SOVA	Completed
Expansion in Soviet Defense Industries: An Indication of Future Weapons Program Activity	SOVA	Completed
The Development of Soviet Military Power: Trends Since 1965 and Prospects for the 1980s	SOVA	Completed
Soviet ABM and BMEW Programs: Status and Options	SOVA	Completed
Prospects for Accelerated Soviet Defense Effort	SOVA	Completed
Land Armaments and Manpower Model (LAMM)	SOVA	2Q82
Warsaw Pact Ground Forces: The Next Two Decades of Change	SOVA	4Q82
<u>Other Selected Scheduled SOVA Projects</u>		
Soviet Fighter Production Programs	SOVA	3Q82
Bureaucratic and Economic Constraints on Soviet Weapon Programs	SOVA	4Q82
Soviet R&D Expenditures	SOVA	4Q82
A Comparison of Soviet and US Defense Activities 1972-81	SOVA	4Q82
Western Technology in Defense-Related Soviet Heavy Industry	SOVA	4Q82
A Method for Costing Alternative Soviet Force Projections	SOVA	Unscheduled
Measuring Price Change in the Soviet Defense Sector	SOVA	Unscheduled External Research
The Tank and the Soviet Army: The Next Two Decades	SOVA	Unscheduled
Ground Forces Development in Non-Soviet Warsaw Pact Forces	SOVA	Unscheduled

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The following recent and ongoing projects provide a representative cross-section of the work produced in OSWR to deal with forecasting future systems and technologies.

<u>Projects Completed</u>	<u>Office</u>	<u>Status</u>
USSR: Strategic Missile Development Programs in the National Economic Planning Process	OSWR	Completed
Management of Soviet Missile and Space Programs: Key to Understanding Soviet Development Capabilities	OSWR	Completed
SALT Uncertainty and Soviet Defense Planning for 1981-85	OSWR/SOVA	Completed
Spacecraft Design and Development Responsibilities of the Glushko Organization	OSWR	Completed
Soviet Development of Solid-Propellant ICBMs: Status and Options	OSWR/SOVA	Completed
Soviet Naval Radar R&D	OSWR	Completed
Future Space Launch Vehicle Capabilities of Kuybyshev Aerospace Production Plant 1	OSWR	Completed
Spacecraft Capability of the Reshetnev Design Bureau	OSWR	Completed
Intelligence Analysis of Soviet Nuclear Weapons Research and Development Facilities	OSWR	Completed

Other Selected Scheduled OSWR Projects

Soviet Liquid Hydrogen Engine Program	OSWR/OIA	4Q82
Soviet Organizations Responsible for Developing Solid Propellant Missiles for the SRF	OSWR/OIA	4Q82
Soviet Cruise Missile Development Process, Participants and Programs	OSWR	4Q82
USSR: Reassignment of Defense Industry Organizations to Support the Space Program	OSWR	2Q83
Soviet Low Frequency Acoustic ASW R&D	OSWR	1Q83
Prospective Soviet Technologies Applicable To Space Systems	OSWR	3Q82

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Soviet Laser Development Industry	OSWR	3Q82
Military Technology Flow Assessment	OSWR	4Q82
Science and the Military in Soviet Military R&D	OSWR	3Q82
USSR: Tank Design Bureau in Leningrad	OSWR/OIA	2Q82
Soviet Nuclear Weapons R&D and Fabrication Facilities	OSWR/OIA	4Q82

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Microanalysis of the Soviet Military Industrial Complex: Areas of Research, Availability of Data and Intelligence Pay-offs

B

Generic Areas of Research

Availability of Data

Intelligence Pay-offs

Infrastructure

Data on R&D and production facilities by plant, by product, by industry, and by design bureau leading to an historic perspective of Soviet activities and capabilities.

- Data are available but not compiled or fully exploited to develop a base-line plant analysis.
- Data availability is uncertain for analyzing R&D and industrial infrastructure for subsystems and components. The little work that has been done, however, has demonstrated the utility of such analysis.

Microanalysis will permit more in-depth responses to intelligence questions on:

- Development and production of military equipment at the plant and industry level.
- Changing trends in the development and production of new military and space programs.

Transferability of Resources

Transferability of military resources to civilian products. Military industrial role in current civilian production. Problems in converting final assembly and subcontracting industries to civilian products. Bureaucratic factors which inhibit or foster change.

- Data are available to analyze the implications of shifts of military resources to the civilian sector.
- Historical data are available to allow in-depth analysis of shifts in emphasis (aircraft to missile, etc.) and transferability of resources within defense R&D and production sectors.

- Shifts in resources (military to military or military to civilian) resulting from arms control agreements.
- Factors which trigger shifts in military industrial emphasis (aircraft to missile, etc) as well as earlier recognition of such shifts.

Technology and its Rate of Development

Flow of technology from domestic and foreign sources from its conception or acquisition to use in military, space and civilian products. Bureaucratic factors which inhibit or allow utilization of new technologies.

- Data on technology transfers are available that would allow a greater appreciation of the pace of adoption of foreign technologies into the military and civilian sectors.
- Data are available on the resistance of the Academy of Sciences to more applied work. Data are needed on the success of civil and military leaders to make the Academy more responsive to their needs.

- Importance of technology in the economy, its impact on growth, and insights into technology transfer leverage questions.
- Technical capabilities and timing of weapons programs by integrating Soviet state-of-the-art with development practices, yielding earlier insights on future programs.

Long Range Forecasting

An understanding of advanced technologies and the way and when they may be used in military, space, and civilian applications. Integration of these technological capabilities with military requirements and doctrine, and political and economic goals.

- Data are available that allow better technological forecasts by linking knowledge of the level of technology with an understanding of the bureaucratic processes.
- Data are available on Soviet military-related scientific research projects that could be used to determine the concepts leading to weapon programs for the 1990s.
- Data are available on the Soviet weapons acquisitions process that can be used to identify a large number of development and production programs now underway.

- Bureaucratic efforts to accelerate the pace of technological assimilation by increasing the participation of the Academy of Sciences in applied technology.
- Long-term projections of future Soviet weapons systems and forces.
- Determination of future weapons programs by analyzing scientific research projects and forecasting Soviet weapon options.

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